

## CLAIMS

What is claimed is:

- 1           1.       A process for providing a representation of specified characteristics of a  
2       previously developed object-oriented software program, said program including a number of  
3       object classes and further including object related methods belonging to respective classes,  
4       said process comprising the steps of:  
  
5           sensing at least one complex method call included in said software program, a  
6       plurality of said methods being associated with each of said complex method calls;  
  
7           extracting a number of single method calls from each of said complex method calls;  
  
8           generating a set of information for each of said methods from said single method  
9       calls, the information set for a particular method containing at least the name of the particular  
10      method and the class to which the particular method belongs; and  
  
11          constructing a representation of interactions between objects of said software program  
12      from the information contained in said method information sets.

- 1           2       The process of Claim 1 wherein:  
  
2           said extracting step comprises replacing a component of a complex method call with  
3       a phase variable to produce a method call of reduced complexity.

- 1           3.       The process of Claim 2 wherein:  
  
2           said process includes an initial step of extracting the name and class of each of said  
3       methods from said software program.

1           4.       The process of Claim 1 wherein:

2           a given complex method call comprises multiple method related components, and  
3       said extracting step comprises recursively substituting a phase variable for each of said  
4       method related components, until said given complex method call has been resolved into  
5       multiple lines, each containing one of said single method calls.

1           5.       The process of Claim 4, wherein said extracting step comprises:

2           a first parsing phase disposed to separate any casting operations included in said  
3       given complex method call;

4           a second parsing phase disposed to isolate any method parameters included in said  
5       given complex method call; and

6           a third parsing phase disposed to resolve any continuous method calls included in said  
7       given complex method call into multiple lines, each containing one of said single method  
8       calls.

1           6.       The process of Claim 5 wherein:

2           said first parsing phase is implemented prior to said second parsing phase, and said  
3       second parsing phase is implemented prior to said third parsing phase.

1           7.       The process of Claim 6 wherein:

2           said step of generating method information sets includes parsing an output provided  
3       by said third parsing phase to determine the correct object class for each of said object related  
4       methods.

1           8.       The process of Claim 7 wherein:

2           said process includes the step of determining whether a method is a user-defined or a  
3       standard API method.

1           9.       The process of Claim 1 wherein:

2           said constructing step comprises constructing a sequence diagram depicting the  
3 interactions between respective objects of said software program.

1           10.      The process of Claim 1 wherein:

2           the sequence diagram displays the condition of a method call to indicate that the call  
3 occurs only when the condition is evaluated to be true.

1           11.      The process of Claim 1 wherein:

2           said software program is in the form of source code.

1           12.      The process of Claim 1 wherein:

2           said software program is written in Java software code.

1           13.      The process of Claim 1 wherein:

2           said software program is written in C++ software code.

1           14.      The process of Claim 1 wherein:

2           at least one of said object related methods in said program is a polymorphic method..

1           15.      The process of Claim 1 wherein:

2           at least one of said object related methods in said program is related to an inheritance  
3 feature, and said extraction step includes tracking an inheritance path until it reaches a parent  
4 class wherein the method is defined.

1           16.     A system for providing a representation of specified characteristics of a  
2     previously developed object-oriented software program, said program including a number of  
3     object classes and object related single methods belonging to respective classes, said program  
4     further including at least one complex method call containing a plurality of said single  
5     methods, said system comprising:

6           a Method Detail Parser unit disposed to extract a number of individual method calls  
7     from each of said complex method calls;

8           a data base operable to store a set of information for each of said single methods, the  
9     information set for a particular single method containing at least the name of the particular  
10    method and the class to which the particular method belongs; and

11          a drawing device operable to construct a representation of interactions between  
12    objects of said software program from the information contained in said method information  
13    sets.

1           17.     The system of Claim 16 wherein:

2           said system includes a Method Information Parser unit disposed to extract the name  
3     and class of each of said single methods from said software program.

1           18.     The system of Claim 17 wherein:

2           said Method Detail Parser unit is disposed to recursively substitute a phase variable  
3     for each of a plurality of method related components contained in a given complex method  
4     call, until said given complex method call has been resolved into multiple lines, each  
5     containing one of said single method calls.

1           19.     The system of Claim 18, wherein:

2           said Method Detail Parser unit is sequentially operated to implement a first parsing  
3 phase to separate any casting operations included in said given complex method call, to  
4 implement a second parsing phase to isolate any method parameters included in said given  
5 complex method call, and to implement a third parsing phase to resolve said given complex  
6 method call into multiple lines, each containing one of said single method calls.

1           20.     The system of Claim 19 wherein:

2           said drawing device is operable to construct a sequence diagram depicting the  
3 interactions between respective objects of said software program.

1           21.     The system of Claim 20 wherein:

2           said software program is in the form of source code.

1           22.     Apparatus for providing a sequence diagram representing specified  
2 characteristics of a previously developed object-oriented software program, said program  
3 including a number of object classes and further including object related methods belonging  
4 to respective classes, said apparatus comprising:

5           means for sensing at least one complex method call included in said software  
6 program, a plurality of said methods being associated with each of said complex method  
7 calls;

8           Method Detail Parser means for extracting a number of single method calls from each  
9 of said complex method calls;

10          means for generating a set of information for each of said object related methods from  
11 said single method calls, the information set for a particular object related method containing  
12 at least the name of the particular method and the class to which the particular method  
13 belongs; and

14          means for constructing sequence diagram representing interactions between objects of  
15 said software program from the information contained in said method information sets.

1           23.     The apparatus if Claim 22 wherein:

2           said apparatus includes Method Information Parser means for extracting the name and  
3           class of each of said methods from said software program.

1           24.     The apparatus of Claim 23 wherein:

2           said Method Detail Parser means is operable to recursively substitute a phase variable  
3           for each of a plurality of method related components contained in a given complex method  
4           call, until said given complex method call has been resolved into multiple lines, each  
5           containing one of said single method calls.

1           25.     The apparatus of Claim 24, wherein:

2           said Method Detail Parser means is disposed to separate any casting operations  
3           included in said given complex method call during a first parsing phase, to isolate any  
4           method parameters included therein during a second parsing phase, and resolve said given  
5           complex method call into multiple lines, each containing one of said single method calls,  
6           during a third parsing phase.

1           26.     The apparatus of Claim 25 wherein:

2           said first parsing phase is implemented prior to said second parsing phase, and said  
3           second parsing phase is implemented prior to said third parsing phase.

1           27.     The apparatus of Claim 26 wherein:

2           said constructing means comprises a drawing engine for depicting interactions  
3           between respective objects of said software program.

1           28.     The apparatus of Claim 27 wherein:

2           said software program is in the form of source code.